

Crestone Peak Resources

CO, Weld County (NAD 83 NZ)
Sec 18 Twn 1 N Rng 67 W
Hingley 1K-18H-A167 Original Hole
05-123-47172
Ensign 153



Final Survey Report

2-Dec-2019

Well Coordinates: NAD83 Colorado State Plane, NZ, US Ft

40.057006	-104.925815
1264133.05 usFt	3160724.4 usFt

Ground Level:	5058.00 ft MSL
TVD Reference:	KB 23ft @ 5081.00 ft MSL
Local Coordinate Origin:	Hingley 1K-18H-A167 well head
Vertical Section Azimuth:	175.470 ° (True North)
North Reference:	True North

DOX Version: 2.1

Hingley 1K-18H-A167 MWD 0' to 12372' Definitive Survey Geodetic Report

(Def Survey)



Report Date: December 02, 2019 - 12:55 PM
Client: Crestone Peak Resources
Field: CO, Weld County (NAD 83 NZ) - 2019
Structure / Slot: Crestone Peak 18-01N-67W (Hingley 18H-A167 Pad) / Hingley 1K-18H-A167
Well: Hingley 1K-18H-A167
Borehole: Original Hole
UWI / API#: Unknown / 05-123-47172
Survey Name: Hingley 1K-18H-A167 MWD 0' to 12372' Definitive
Survey Date: October 23, 2019
Tort / AHD / DDI / ERD Ratio: 217.838 ° / 5944.322 ft / 6.327 / 0.788
Coordinate Reference System: NAD83 Colorado State Plane, Northern Zone, US Feet
Location Lat / Long: N 40° 3' 25.22160", W 104° 55' 32.93400"
Location Grid N/E Y/X: N 1264133.048 ftUS, E 3160724.404 ftUS
CRS Grid Convergence Angle: 0.3710 °
Grid Scale Factor: 0.99996253
Version / Patch: 2.10.787.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 175.470 ° (True North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB 23ft
TVD Reference Elevation: 5081.000 ft above MSL
Seabed / Ground Elevation: 5058.000 ft above MSL
Magnetic Declination: 8.226 °
Total Gravity Field Strength: 998.9702mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 51961.569 nT
Magnetic Dip Angle: 66.353 °
Declination Date: October 25, 2019
Magnetic Declination Model: HDGM 2019
North Reference: True North
Grid Convergence Used: 0.0000 °
Total Corr Mag North->True North: 8.2261 °
Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim True (°)	TVD (ft)	NS (ft)	EW (ft)	VSEC (ft)	DLS (°/100ft)	BR (°/100ft)
Surface	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A
KB Adjustment	10.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
Begin Surface Survey	112.00	0.35	296.72	112.00	0.14	-0.28	-0.16	0.34	0.34
	202.00	2.82	28.92	201.96	2.20	0.55	-2.15	3.17	2.74
	294.00	3.17	29.97	293.84	6.39	2.91	-6.14	0.39	0.38
	384.00	3.26	27.77	383.70	10.81	5.35	-10.35	0.17	0.10
	473.00	4.22	22.59	472.50	16.07	7.78	-15.40	1.14	1.08
	544.00	5.11	26.24	543.27	21.32	10.19	-20.45	1.32	1.25
	633.00	6.06	24.08	631.85	29.16	13.86	-27.98	1.09	1.07
	715.00	7.06	22.76	713.31	37.76	17.57	-36.25	1.23	1.22
	805.00	8.10	20.99	802.52	48.78	21.98	-46.89	1.18	1.16
	891.00	6.80	22.80	887.79	59.13	26.13	-56.88	1.54	-1.51
	977.00	7.04	18.19	973.17	68.83	29.74	-66.27	0.70	0.28
	1063.00	7.79	19.34	1058.45	79.34	33.32	-76.46	0.89	0.87
	1152.00	6.35	27.93	1146.77	89.38	37.62	-86.13	2.00	-1.62
	1242.00	6.94	28.97	1236.17	98.53	42.59	-94.86	0.67	0.66
	1331.00	7.42	30.46	1324.47	108.19	48.10	-104.05	0.58	0.54
	1418.00	8.16	30.38	1410.66	118.36	54.08	-113.72	0.85	0.85
	1508.00	8.75	30.19	1499.69	129.79	60.75	-124.58	0.66	0.66
	1598.00	9.58	30.53	1588.54	142.16	67.99	-136.34	0.92	0.92
	1684.00	7.79	25.96	1673.55	153.56	74.18	-147.22	2.23	-2.08
	1774.00	7.95	24.32	1762.70	164.72	79.42	-157.93	0.31	0.18
	1863.00	7.86	24.43	1850.85	175.87	84.47	-168.65	0.10	-0.10
	1952.00	8.20	24.28	1938.98	187.19	89.59	-179.53	0.38	0.38
	2041.00	8.53	23.56	2027.03	199.03	94.84	-190.92	0.39	0.37
	2131.00	8.75	25.93	2116.01	211.30	100.50	-202.70	0.46	0.24
	2220.00	6.95	27.47	2204.18	222.17	105.95	-213.11	2.04	-2.02
	2310.00	6.54	30.50	2293.55	231.42	111.06	-221.92	0.60	-0.46
	2399.00	6.28	34.63	2382.00	239.79	116.40	-229.85	0.59	-0.29
	2488.00	6.83	37.33	2470.41	248.00	122.37	-237.56	0.71	0.62
Last Surface Survey	2529.00	6.77	40.41	2511.13	251.78	125.42	-241.09	0.90	-0.15
9 5/8" Casing Begin	2600.00	5.91	40.41	2581.69	257.75	130.50	-246.64	1.21	-1.21
SLB_MWD Survey	2685.00	4.88	40.41	2666.31	263.84	135.68	-252.30	1.21	-1.21
	2774.00	8.53	28.49	2754.69	272.52	141.29	-260.51	4.37	4.10
	2863.00	9.96	22.35	2842.54	285.44	147.36	-272.91	1.95	1.61
	2952.00	10.54	32.93	2930.13	299.40	154.72	-286.24	2.21	0.65
	3041.00	10.25	23.84	3017.67	313.47	162.34	-299.67	1.87	-0.33
	3130.00	9.74	18.46	3105.32	327.86	167.93	-313.57	1.19	-0.57
	3219.00	9.98	26.16	3193.01	341.92	173.71	-327.13	1.50	0.27
	3308.00	10.21	31.10	3280.63	355.60	181.19	-340.18	1.01	0.26
	3397.00	11.23	35.50	3368.08	369.41	190.29	-353.22	1.47	1.15
	3486.00	10.40	30.35	3455.50	383.39	199.38	-366.45	1.43	-0.93
	3575.00	10.85	34.90	3542.98	397.20	208.24	-379.51	1.07	0.51
	3664.00	10.82	33.38	3630.39	411.04	217.62	-392.57	0.32	-0.03
	3753.00	10.64	28.19	3717.84	425.26	226.10	-406.07	1.10	-0.20
	3842.00	10.96	34.25	3805.26	439.50	234.75	-419.58	1.32	0.36
	3931.00	10.54	28.05	3892.70	453.67	243.34	-433.04	1.38	-0.47
	4020.00	10.82	28.93	3980.16	468.17	251.20	-446.87	0.36	0.31
	4109.00	11.16	20.95	4067.53	483.53	258.33	-461.61	1.75	0.38
	4198.00	11.12	13.14	4154.86	499.93	263.36	-477.57	1.69	-0.04
	4287.00	10.99	23.93	4242.22	516.04	268.75	-493.20	2.33	-0.15
	4376.00	10.80	17.15	4329.62	531.76	274.65	-508.41	1.45	-0.21
	4465.00	10.99	21.19	4417.02	547.64	280.17	-523.80	0.88	0.21
	4554.00	11.03	26.30	4504.38	563.18	287.01	-538.76	1.10	0.04
	4643.00	11.01	33.15	4591.74	577.93	295.43	-552.79	1.47	-0.02
	4732.00	10.93	23.04	4679.13	592.81	303.38	-567.00	2.16	-0.09
	4821.00	11.11	30.01	4766.49	608.00	310.97	-581.54	1.51	0.20
	4910.00	10.71	27.58	4853.88	622.76	319.09	-595.61	0.68	-0.45
	5000.00	10.77	27.19	4942.30	637.65	326.81	-609.85	0.10	0.07
	5089.00	10.90	33.56	5029.72	652.06	335.26	-623.55	1.35	0.15
	5178.00	10.62	21.32	5117.17	666.72	342.89	-637.55	2.58	-0.31
	5267.00	10.03	24.18	5204.73	681.43	349.05	-651.73	0.88	-0.66
	5356.00	10.46	32.58	5292.31	695.31	356.57	-664.97	1.75	0.48
	5445.00	10.87	43.30	5379.78	708.22	366.68	-677.05	2.27	0.46
	5534.00	10.79	36.57	5467.20	721.02	377.40	-688.96	1.42	-0.09
	5623.00	8.33	19.24	5554.98	733.80	384.49	-701.14	4.22	-2.76

Comments	MD (ft)	Incl (°)	Azim True (°)	TVD (ft)	NS (ft)	EW (ft)	VSEC (ft)	DLS (°/100ft)	BR (°/100ft)
	5712.00	4.52	0.89	5643.41	743.40	386.67	-710.54	4.81	-4.28
	5801.00	1.69	322.90	5732.28	747.95	385.93	-715.14	3.77	-3.18
	5890.00	0.05	240.10	5821.26	748.98	385.11	-716.23	1.89	-1.84
	6068.00	0.17	338.51	5999.26	749.19	384.94	-716.45	0.10	0.07
	6157.00	0.15	316.14	6088.26	749.40	384.82	-716.66	0.07	-0.02
	6246.00	0.12	308.02	6177.26	749.54	384.66	-716.81	0.04	-0.03
	6335.00	0.09	132.45	6266.26	749.55	384.64	-716.83	0.24	-0.03
	6424.00	0.14	160.01	6355.26	749.40	384.73	-716.67	0.08	0.06
	6513.00	0.15	342.77	6444.26	749.41	384.73	-716.68	0.33	0.01
	6691.00	0.09	252.92	6622.26	749.59	384.53	-716.88	0.10	-0.03
	6780.00	0.14	33.99	6711.26	749.66	384.52	-716.95	0.24	0.06
	6869.00	1.98	214.47	6800.25	748.48	383.71	-715.84	2.38	2.07
	6958.00	10.58	210.61	6888.63	740.17	378.67	-707.95	9.67	9.66
	7047.00	16.80	203.72	6975.06	721.34	369.33	-689.92	7.21	6.99
	7136.00	21.94	190.07	7059.04	693.16	361.24	-662.46	7.66	5.78
	7225.00	26.15	178.09	7140.35	657.15	358.98	-626.74	7.22	4.73
	7315.00	31.24	176.66	7219.27	614.00	361.00	-583.57	5.71	5.66
	7404.00	37.92	186.25	7292.56	563.68	359.37	-533.54	9.66	7.51
	7493.00	47.82	187.99	7357.71	503.69	351.79	-474.33	11.20	11.12
	7582.00	58.01	184.77	7411.31	433.22	344.04	-404.70	11.81	11.45
	7671.00	67.18	181.30	7452.25	354.42	339.97	-326.46	10.87	10.30
	7760.00	76.40	179.32	7480.03	269.97	339.55	-242.31	10.57	10.36
	7849.00	80.72	178.95	7497.68	182.77	340.87	-155.28	4.87	4.85
	7938.00	83.32	178.16	7510.03	94.67	343.09	-67.28	3.05	2.92
Cross Setback (460' FNL, 173' FEL)	7984.13	85.33	177.60	7514.60	48.80	344.79	-21.42	4.51	4.35
	8027.00	87.19	177.09	7517.39	6.07	346.77	21.34	4.51	4.35
	8117.00	88.53	177.09	7520.76	-83.75	351.33	111.24	1.49	1.49
	8206.00	88.91	177.20	7522.74	-172.62	355.76	200.18	0.44	0.43
	8295.00	88.36	177.54	7524.86	-261.50	359.85	289.10	0.73	-0.62
	8384.00	88.82	178.12	7527.05	-350.41	363.22	378.00	0.83	0.52
	8473.00	89.04	178.20	7528.72	-439.35	366.07	466.89	0.26	0.25
	8562.00	88.69	178.59	7530.48	-528.29	368.57	555.75	0.59	-0.39
	8651.00	88.67	178.48	7532.53	-617.24	370.84	644.60	0.13	-0.02
	8740.00	88.71	178.80	7534.56	-706.19	372.95	733.44	0.36	0.04
	8829.00	88.84	178.69	7536.47	-795.15	374.90	822.28	0.19	0.15
	8918.00	88.83	179.00	7538.28	-884.11	376.69	911.10	0.35	-0.01
	9007.00	88.67	178.51	7540.22	-973.07	378.63	999.94	0.58	-0.18
	9096.00	88.74	178.52	7542.23	-1062.02	380.93	1088.79	0.08	0.08
	9185.00	89.15	180.32	7543.87	-1150.99	381.83	1177.56	2.07	0.46
	9275.00	89.44	181.68	7544.97	-1240.97	380.26	1267.13	1.54	0.32
	9364.00	90.19	183.07	7545.26	-1329.89	376.58	1355.48	1.77	0.84
	9453.00	91.38	184.66	7544.04	-1418.68	370.58	1443.51	2.23	1.34
	9542.00	91.17	185.47	7542.06	-1507.31	362.72	1531.25	0.94	-0.24
	9631.00	91.41	184.28	7540.06	-1595.96	355.16	1619.03	1.36	0.27
	9720.00	91.69	181.19	7537.65	-1684.82	350.92	1707.27	3.48	0.31
	9809.00	91.48	179.89	7535.19	-1773.78	350.08	1795.88	1.48	-0.24
	9898.00	91.65	178.14	7532.76	-1862.73	351.61	1884.68	1.97	0.19
	9987.00	91.15	177.69	7530.58	-1951.64	354.84	1973.57	0.76	-0.56
	10076.00	91.28	177.45	7528.70	-2040.54	358.62	2062.49	0.31	0.15
	10165.00	91.33	177.37	7526.67	-2129.43	362.64	2151.42	0.11	0.06
	10255.00	91.03	176.93	7524.82	-2219.29	367.11	2241.36	0.59	-0.33
	10344.00	91.25	176.84	7523.05	-2308.15	371.95	2330.31	0.27	0.25
	10433.00	91.22	177.55	7521.13	-2397.02	376.30	2419.25	0.80	-0.03
	10522.00	91.22	178.59	7519.23	-2485.95	379.30	2508.14	1.17	0.00
	10611.00	90.92	180.03	7517.57	-2574.92	380.37	2596.92	1.65	-0.34
	10700.00	90.90	181.07	7516.16	-2663.91	379.52	2685.56	1.17	-0.02
	10789.00	91.21	181.88	7514.52	-2752.86	377.22	2774.05	0.97	0.35
	10878.00	91.36	182.90	7512.52	-2841.76	373.51	2862.38	1.16	0.17
	10967.00	91.39	183.28	7510.39	-2930.60	368.72	2950.57	0.43	0.03
	11056.00	91.30	182.85	7508.30	-3019.45	363.96	3038.77	0.49	-0.10
	11146.00	91.34	182.18	7506.22	-3109.34	360.01	3128.06	0.75	0.04
	11234.00	90.87	181.26	7502.79	-3287.22	354.67	3304.97	0.58	-0.26
	11413.00	90.77	180.48	7501.52	-3376.20	353.32	3393.56	0.88	-0.11
	11591.00	90.79	180.07	7499.09	-3554.19	352.47	3570.92	0.23	0.01
	11680.00	90.99	179.54	7497.71	-3643.17	352.77	3659.66	0.64	0.22
	11858.00	90.85	178.89	7494.85	-3821.13	355.21	3837.25	0.37	-0.08
	11947.00	90.74	178.38	7493.62	-3910.10	357.33	3926.11	0.59	-0.12
	12036.00	90.00	179.70	7493.04	-3999.08	358.82	4014.93	1.70	-0.83
	12125.00	89.60	180.51	7493.35	-4088.08	358.65	4103.64	1.02	-0.45
	12304.00	89.45	183.53	7494.84	-4266.94	352.35	4281.44	1.69	-0.08
Last SLB_MWD Survey	12349.00	89.73	184.65	7495.16	-4311.83	349.14	4325.93	2.57	0.62
Projection to Bit (467' FSL, 127' FEL)	12372.00	89.73	184.65	7495.27	-4334.75	347.27	4348.64	0.00	0.00

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	23.000	1/98.425	30.000	30.000	NAL_MWD-NON_SLB-Depth Only	Original Hole / Hingley 1K-18H-A167 MWD 0' to 12372' Definitive
	1	23.000	2600.000	Act Stns	30.000	30.000	NAL_MWD-NON_SLB	Original Hole / Hingley 1K-18H-A167 MWD 0' to 12372' Definitive
	1	2600.000	12372.000	Act Stns	30.000	30.000	NAL_MWD_PLUS_0.5_DEG	Original Hole / Hingley 1K-18H-A167 MWD 0' to 12372' Definitive